UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,423	01/23/2004	Nelson Liang An Chang	200310822-1	2026

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EXAMINER
HOLTON, STEVEN E

ART UNIT	PAPER NUMBER
2629	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/22/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

		Application No.	Applicant(s)
Office Action Summary		10/764,423	CHANG ET AL.
		Examiner	Art Unit	
		Steven E. Holton	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>23 January 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1.   Claims 32 and 64 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The preamble of the claims states "a machine readable medium storing machine-readable instructions..." Under the current guidelines used by the USPTO a machine readable medium is considered non-statutory. A computer-readable medium storing computer-readable instructions is currently considered statutory.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1, 2, 4-12, 14, 15, 19, 20, and 22- 31 are rejected under 35 U.S.C. 102(e)

as being anticipated by Pryor et al. (USPN: 7042440), hereinafter Pryor.

Regarding claims 1 and 31, the claims are drawn to a method of operation and

associated input device, Pryor discloses a computer input system that acquires images

of an interactive space from multiple fields of view and then detecting an input target in

the acquired images (Fig. 7, element Step 1) and then computes the coordinates of the

detected target (Fig. 7, element Step 4). Pryor then calculates patterns of location,

orientation and timing of the movement of the input target (Fig. 7, elements 7A),

processes the information to determine if the calculated movement equals a target path

to determine the movement to determine a command (Fig. 7, elements Step 7C and 8)

and then executes the input instruction based on the gesture made by the input target

(col. 43, lines 43-63).

Regarding claim 2, Pryor discloses using stereoscopic pairs of images (Fig. 1c;

col. 9, lines 15-35).

Regarding claims 4 and 5, Pryor discloses using a threshold image to determine

input location and calculating the centroid of a group of pixels (Fig. 1d; col. 12, lines 41-

64).

Regarding claim 6, Pryor discloses subtracting background pixels from

foreground pixels in the received images (col. 12, lines 27-30).

Regarding claim 7, Pryor discloses using cameras as the input devices to receive

different images and then using the different images to determine the coordinates of the

input target (col. 10, lines 19-49). The Examiner notes that all images received by a

camera appear as a two-dimensional image when the information is read from the camera.

Regarding claims 8 and 9, Pryor discloses computing three-dimensional coordinates based on sets if two-dimensional data and calibration data for the cameras (col. 14, line 46 – col. 15, line 3).

Regarding claim 10, Pryor discloses using input gestures based on input coordinates to manipulate a computer system (col. 27, line 43 – col. 28, line 43). This inherently requires associating the measured input locations with the times the locations occurred. Without such an association it would be impossible to determine if a gesture has occurred.

Regarding claims 11 and 12, Pryor discloses using colors and associating them with the input target for determining the input made by the input target (Fig. 1e; col. 13, lines 19-57).

Regarding claims 14 and 15, Pryor discloses determining trace routes of connected input targets in time and based on state changes of the input target (Fig. 7, element Step 7A).

Regarding claims 19 and 20, Pryor discloses comparing an identified trace or gesture by a user to a predetermined representation of an input gesture (col. 27, line 43 – col. 28, line 8).

Regarding claims 22-29, Pryor discloses determining gestures and input motions and then manipulating items within a virtual environment of a game or otherwise. Pryor further includes the gestures to be associated with predetermined computer instructions ·

and manipulates objects in the virtual environment based on the gesture inputs (col. 27, line 43 – col. 28, line 43).

Regarding claim 30, Pryor discloses calculating input coordinates based on a pair of input cameras (Fig. 1c, elements 60 and 61). The actual position is determined by interpolating based on the input images to generate a view of the object within the interactive space.

3.   Claims 33, 34, 37, 39, 40, and 63 are rejected under 35 U.S.C. 102(e) as being anticipated by Pulli et al. (USPN: 6771294), hereinafter Pulli.

Regarding claims 33 and 63, the Examiner notes these claims are a method of operation and associated input device. Pulli discloses an input device and associated method of operation that includes displaying an image at a display location between a viewing space and interactive space (Figs. 2 and 3), acquiring images of the interactive space from at least one field of view (Fig. 2a, elements 100A and 100B are cameras), detecting an input target in the images, computing coordinates, identifying an instruction based on input coordinates and executing an instruction based on the coordinates (col. 4, lines 15- 45 describe the input device; col. 7, line 17 – col. 8, line 2 describe one method of the user interacting with the device).

Regarding claim 34, Pulli discloses using a portable electronic device (abstract).

Regarding claim 37, Pulli discloses using a field of view disposed between the display location and the interactive location (Fig. 2a, the cameras on the lenses are between the display location (the lenses) and the interactive area (in front of the user).

Regarding claim 39, Pulli discloses using multiple fields of view (Fig. 2a,

elements 100a and 100b are cameras).

Regarding claim 40, Pulli discloses changing displaying information based on the

information from comparing the input of the cameras. This would require interpolating

position based on the information from both cameras and producing the images based

on that interpolated input (col. 4, lines 15-45).

4.   Claims 33 and 35 are rejected under 35 U.S.C. 102(a) as being anticipated by

Kurtenbach et al. (USPgPub: 2003/0142067), hereinafter Kurtenbach.

Regarding claim 33, Kurtenbach discloses a display and interaction system that

displays an image in a display location between a viewing space and an interactive

space (Fig. 2, image space is in element 34, the interactive space is element 32),

acquiring images of the interactive space from at least one field of view, detecting an

input target in the images, computing coordinates and identifying and executing

instructions based on the input (paragraph 24). The users hand is detected by cameras

and then used to interact with the display.

Regarding claim 35, Kurtenbach discloses the display location corresponding to

an area in a desktop surface (Fig. 2, element 32).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pryor.

Regarding claim 13, Pryor discloses all of the limitations except, "wherein the

spatiotemporal input data structure is constructed in the form of a linked list of data

records."

The Examiner notes that the use of a linked list data structure to store input data

would be a design choice for one skilled in the art. One skilled in the art would be

motivated to utilize a linked list data structure because of the ability of a linked list to

store a sequence of information in order with each piece of data being linked directly to

the following (and sometimes preceding) data. It would be an obvious choice for one

skilled in the art to use a linked list to store a sequence of input positions associated in a

sequence of time.

6.   Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pryor in

view of Kumar et al. (USPN: 6204852), hereinafter Kumar.

Regarding claim 3, as discussed above, Pryor discloses all of the information

except, "wherein images of the interactive space are acquired from at least three

different fields of view."

Kumar discloses a three-dimensional input system using three cameras (Fig. 1, elements 16, 18, and 19).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Pryor and Kumar. The motivation for combining the two references would be to use a different number of cameras or different camera set-up for determining the location of an input object within a three-dimensional input space. It would have been obvious that the use of a pair of binocular cameras or 3 cameras, or any other number of cameras would be a matter of design choice for determining input locations of an object within three dimensions. Therefore, it would have been obvious to combine the teachings of Pryor and Kumar to produce the method as described in claim 3.

7.   Claims 16- 18, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pryor in view of Schmalstieg et al. (USPN: 6842175), hereinafter Schmalstieg.

Regarding claim 16, as discussed above Pryor discloses all of the limitations except, "wherein identifying traces comprises computing coordinates of bounding regions encompassing respective traces."

Schmalstieg discloses using a bounding box around a stroke to determine the location and coordinates of an input stroke (col. 21, line 61 – col. 22, line 14).

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Pryor and Schmalstieg. Schmalstieg discloses methods of

determining the locations of strokes detected by cameras for an input system. This method includes using a bounding box to determine the stroke location. Although, Schmalstieg deals with 2-dimensional input the technique could be applied to each of the cameras used in the Pryor system to produce the same results. The motivation for combining the teachings of these references would be to apply known techniques of input trance determination as discussed by Schmalstieg to a three-dimensonal input system used to determine input traces and gestures of Pryor. At the time of invention it would have been obvious to one skilled in the art that the bounding box principles described by Schmalstieg could modified to be used with the camera input system of Pryor to determine the locations of input strokes in three-dimensional space. Thus, the combination of Pryor and Schmalstieg disclose the invention of claim 16.

Regarding claims 17, Schmalstieg discloses the bounding box being part of a two-dimensional input gesture form a single camera (col. 21, line 61- col. 22, line 14).

Regarding claim 18, the Examiner notes that it would be logically obvious to one skilled in the art that multiple bounding boxes from different camera angles could be used to determine a bounding region around a gesture made in three-dimensional space. Logically, by defining bounding areas based on images from each camera, the three-dimensional region defined by the intersection of the bounding regions would therefore be a bounding region in three-dimensions for the detected input traces and gestures.

Regarding claim 21, Schmalstieg discloses using gestures to write letters and numbers using input gestures measured by the camera input system (col. 20, line 26 – col. 21, line 6).

Claims 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pulli.

Regarding claim 36, the Examiner takes Official Notice that it is well-known in the art to produce wearable display glasses that utilize projection means to project images onto surfaces within the lenses of the glasses. The use of projection based systems mounted on the glasses are well-known and common in the area of head mounted displays. One skilled in the art would be motivated to use projection displays or other types of displays based on design choice and the type of glasses being used.

Regarding claim 38, the Examiner takes Official Notice that it is well known in the art that a wearable computer system with display glasses and a camera integrated with the glasses can position the glasses in the middle of the field of view where it would intersect the central area of the display location. The position of the input cameras may be over the eyes, along the outsides of the frames or in a central position between the frames along the central optical axis. One skilled in the art would be motivated to position the input cameras in such a manner as to detect desired information for use with the input system whether the camera would be centrally located or located at other positions away from the displays.

8.   Claims 41 –48, 52-60, and 62 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Pulli in view of Pryor.

Regarding claim 41, as discussed above, Pulli discloses all of the limitations

except, "computing calibration parameters for the multiple fields of view."

Pryor discloses calculating calibration data for different cameras to correct for

distortion of the images (col. 15, lines 1-3).

At the time of invention it would have been obvious to one skilled in the art to

combine the teachings of Pulli and Pryor. As both systems are drawn towards input of

coordinates and locations based on camera images of an input device, it would have

been logical that any of the camera and coordinate calculation methods described by

Pryor could be used on the cameras and information used in the Pulli system. The

cameras of the Pulli system are only different from the cameras of the Pryor system

because the Pulli system is a wearable system and the Pryor system is a non-wearable

system. The motivation would be to apply the calibration and calculation techniques for

determining input coordinates disclosed by Pryor with the camera input system utilized

by Pulli. Therefore, it would have been obvious to combine the teachings of Pulli and

Pryor to produce the device of claim 41.

Regarding claim 42, Pryor discloses using the two-dimensional information from

input images and calibration data to determine coordinates of the input target (col. 14,

line 46- col. 15, line 3).

Regarding claims 43 and 44, Pryor discloses using a threshold image to determine input location and calculating the centroid of a group of pixels (Fig. 1d; col. 12, lines 41-64).

Regarding claim 45, Pryor discloses subtracting background pixels from foreground pixels in the received images (col. 12, lines 27-30).

Regarding claim 46, Pryor discloses using cameras as the input devices to receive different images and then using the different images to determine the coordinates of the input target (col. 10, lines 19-49). The Examiner notes that all images received by a camera appear as a two-dimensional image when the information is read from the camera.

Regarding claims 47 and 48, Pryor discloses determining trace routes of connected input targets in time and based on state changes of the input target (Fig. 7, element Step 7A).

Regarding claims 52 and 53, Pryor discloses comparing an identified trace or gesture by a user to a predetermined representation of an input gesture (col. 27, line 43 – col. 28, line 8).

Regarding claims 55 - 62, Pryor discloses determining gestures and input motions and then manipulating items within a virtual environment of a game or otherwise. Pryor further includes the gestures to be associated with predetermined computer instructions and manipulates objects in the virtual environment based on the gesture inputs (col. 27, line 43 – col. 28, line 43).

9.   Claims 49-51 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Pulli in view of Pryor and in further view of Schmalsteig.

Regarding claim 49, as discussed above, the combination of Pulli and Pryor

disclose all of the information except, "wherein identifying traces comprises computing

coordinates of bounding regions encompassing respective traces."

Schmalstieg discloses using a bounding box around a stroke to determine the

location and coordinates of an input stroke (col. 21, line 61 – col. 22, line 14).

At the time of invention it would have been obvious to one skilled in the art to

combine the teachings of Pulli, Pryor and Schmalstieg. Schmalstieg discloses methods

of determining the locations of strokes detected by cameras for an input system. This

method includes using a bounding box to determine the stroke location. Although,

Schmalstieg deals with 2-dimensional input the technique could be applied to each of

the cameras used in the Pulli and Pryor systems to produce the same results. The

motivation for combining the teachings of these references would be to apply known

techniques of input trance determination as discussed by Schmalstieg to a three-

dimensonal input system used to determine input traces and gestures of Pryor. At the

time of invention it would have been obvious to one skilled in the art that the bounding

box principles described by Schmalstieg could modified to be used with the camera

input system of Pryor and Pulli to determine the locations of input strokes in three-

dimensional space. Thus, the combination of Pulli, Pryor, and Schmalstieg disclose the

invention of claim 49.

Regarding claims 50, Schmalstieg discloses the bounding box being part of a two-dimensional input gesture form a single camera (col. 21, line 61- col. 22, line 14).

Regarding claim 51, the Examiner notes that it would be logically obvious to one skilled in the art that multiple bounding boxes from different camera angles could be used to determine a bounding region around a gesture made in three-dimensional space.

Regarding claim 54, Schmalstieg discloses using gestures to write letters and numbers using input gestures measured by the camera input system (col. 20, line 26 – col. 21, line 6).

Conclusion

10.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wells et al. (USPN: 5334991) discloses a head mounted display system using a projection method to display images on the glasses lens. Mann (USPN: 6307526) discloses a head mounted display system with a centrally located camera.

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven E. Holton whose telephone number is (571) 272-7903. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Division 2629
March 18, 2007

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SUPERVISORY PATENT EXAMINER